DOCUMENT RESUME

ED 448 711 IR 020 474

AUTHOR	Farmer, Shanan W.; Sobieszcyk, Frank; Farmer, Rachelle
TITLE	The Development of an All-in-One Virtual Campus from Ground Zero.
PUB DATE	1999-10-00
NOTE	7p.; In: WebNet 99 World Conference on the WWW and Internet Proceedings (Honolulu, Hawaii, October 24-30, 1999); see IR 020 454.
PUB TYPE	Reports - Descriptive (141) -- Speeches/Meeting Papers (150)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	*Computer System Design; *Computer Uses in Education; Courseware; *Distance Education; Educational Administration; Educational Technology; Higher Education; Material Development; *Systems Development; World Wide Web
IDENTIFIERS	Course Development; Department of Defense; Technology Integration; Technology Utilization; *Virtual Universities; *Web Based Instruction

ABSTRACT

This paper describes the authors' experiences in developing an all-in-one virtual university. The Defense Acquisition University (DAU) is a consortium of Department of Defense education and training institutions and organizations that provides mandatory and assignment-specific courses for military and civilian personnel serving in 11 acquisition career fields. The DAU virtual campus is a unique model for World Wide Web-based instruction because it integrates all aspects of managing a corporate university while providing myriad dynamic layers of access privileges. The Operational Support System (OSS) provides functionality in 16 main areas, i.e., DAU public Web site, registration, enrollment, login, OSS user types, OSS collaboration tools, search, history, logs, reports, canned e-mail, feedback, help, courseware interfaces, test application, and database interfaces. The first section of the paper discusses why DAU is transitioning to the OSS. The second section summarizes the purpose of the OSS, including the following components: student registration, course enrollment, test delivery, course evaluation, student tracking, report generation, problem resolution, and site collaboration. The third section describes DAU's approach to developing courseware, including considerations related to learner interactions, testing and evaluation, and student-faculty interactions. The third section addresses defining the course structure, including test questions, deciding which OSS tools to integrate, and populating OSS tools. (MES)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 448 711

The Development of an All-in-one Virtual Campus From Ground Zero

Shanan W. Farmer
Instructional Systems Specialist
Defense Acquisition University/NFCTC
3502 Goodspeed St. Ste. 2
Port Hueneme, CA USA 93043-4337
Farmersw@nfctc.navy.mil

Frank Sobieszcyk
Director of University Operations
Defense Acquisition University
2001 N. Beauregard St.
Alexandria, VA USA 2231-11772
sobiesf@acq.osd.mil

Rachelle Farmer
Teacher
Los Angeles Unified School District
USA

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

G.H. Marks

Abstract The purpose of this paper is to share our experiences in developing a unique all-in-one virtual university. The Defense Acquisition University virtual campus is a unique model for web based instruction because it integrates all aspects of managing a corporate university while providing myriad dynamic layers of access privileges. The OSS provides functionality in 16 main areas. DAU Public Website, Registration, Enrollment , Login , OSS User Types, OSS Collaboration Tools, Search , History, Logs, Reports, Canned Email, Feedback, Help, Courseware Interfaces, Test Application , and Database Interfaces.. We are currently on the fourth build of the system and have since added many new features and functions since its inception. Given the conference's paper restrictions for length, we have attempted to squeeze as much information as possible regarding the DAU's Virtual Campus. However, the information is best conveyed through a live presentation and a demo of the site. We welcome additional comments and questions regarding the site and our presentation.

Introduction

The purpose of this paper is to share our experiences in developing a unique all-in-one corporate university with the hope you will prevent non-desirable occurrences and glean the positive attributes in your own development of a virtual campus. The Operational Support System (OSS), https://dau.fedworld.gov/dau/index2.htm is the web-enabled GroupWare based administrative infrastructure used by the Defense Acquisition University (DAU) to support its effort in migrating its teaching approach to embrace distance learning concepts in a virtual campus milieu. Several commercial products were examined and failed to perform all of the functions contained in the OSS. Consequently, Booze Allen & Hamilton, Inc developed the OSS under contract. The OSS supports student registration, tracking, courseware distribution, scheduling, and a help desk. Other functions include the ability to maintain course schedules and information, schedule classes at various schools, allocate quotas, manage class registration, maintain class rosters, maintain a grade book, and historical training information. The OSS has 16 main functions and is dynamically layered according various roles and access privileges.

Why is DAU Transitioning to the OSS?

The Defense Acquisition University is a consortium of Department of Defense education and training institutions and organizations that provides mandatory and assignment-specific courses for military and civilian personnel serving in 11 acquisition career fields. The DAU's mission is to educate and train professionals for effective service in the defense acquisition system.

IR020474

BEST COPY AVAILABLE

The DAU is anticipating a number of changes in the makeup of the DoD acquisition workforce. Over the next several years, the DoD acquisition workforce will increase in number from approximately 105,000 to 180,000 or more. Although the DAU student population will increase significantly, DAU will not experience an increase in funding. In response to this situation, the DAU Board of Visitors has recommended that DAU apply technology to its training and educational curriculum. Additional guidance on moving to technology-supported education and training has been provided by the Under Secretary of Defense (AT&T) and the Vice President of the United States.

To meet these directions and to permit maximum access and most efficient use by the acquisition workforce, DAU chose to use the latest educational technologies to design an integrated and accessible distributed education system. The overall objective of DAU's distance education system is to provide a more easily accessible, high quality program of instruction that will help the acquisition workforce acquire the skills and information necessary to keep pace with today's changing world. Specifically, the development of the system is guided by the following DAU educational requirements: provide access to all DAU education and training through a single portal, support materials developed using any DAU selected authoring tools, manage all delivery modes for all courses, maintain an open system for sharing of data and course materials (i.e., support the sharing of information/training modules with all who have a need for them), and provide centralized administration with distributed management of university functions.
As part of this distance education system initiative, DAU is migrating its teaching strategy to embrace distance learning concepts. The effort includes the analysis, design, and implementation of courseware to be delivered using web-enabled technology as well as extensive application development for the web-enabled administrative infrastructure. This administrative infrastructure is the Operational Support System (OSS).

The DAU Public Website serves as the DAU home page. The DAU Public Website is displayed when a user initially accesses the OSS. Visitors to the DAU Public Website include DoD personnel, authorized non-DoD personnel authorized to formally take DAU courses, and visitors (non-DoD personnel. The DAU Public Website provides users with the ability to register for DAU accounts, and log in to access full OSS functionality and on-line courses, and has an online catalog containing general information about DAU.
The DAU Virtual Campus serves as the user's Home Desktop within the OSS. The user's DAU Virtual Campus Desktop is displayed when a user logs in to the OSS. Access to the DAU Virtual Campus is limited to authorized users with OSS accounts, including DoD personnel and non-DoD personnel authorized to take DAU courses. The OSS collaboration tools and other functions available at this level include Task, News, Library, Glossary, Forum, FAQ, Email, Chat, Calendar, Utilities, Feedback, Search, Reports, User Directory, Site Map, Help, and Logout. The functions available to a user at the DAU Virtual Campus vary depending on the user's role. Depending on their user role, approved users of the DAU Virtual Campus can access specific DAU online training courses, administer courses and users, manage course enrollment, access the Help Desk, register for online training courses, view their course enrollment history, and generate system reports. All users have the capability to maintain their personal information including password and personnel information from the DAU Virtual Campus. The OSS automatically logs out any user that has been logged in with no system activity after 4 hours.

What is the Purpose of the OSS?

The purpose of the OSS is to provide system users such as instructors, students, schools, registrars, etc. with the tools necessary to deliver computer-based training (CBT) courses over the Internet, enroll in training courses, schedule training courses, manage course quotas and registrations, collaborate with others, etc. The OSS contains all the functionality necessary to provided a uniform delivery of courseware. The OSS operates as the student management infrastructure to present web-enabled courseware as well as all DAU necessary operational functionality. To support DAU, the OSS supports the following components.

Student Registration - The creation and maintenance of user accounts. The student registration function verifies that users are DoD authorized users and provides different templates depending on the users roles. User roles are defined in Section 2 and are based on the privilege model.

Course Enrollment - The access of on-line course and registration in any DAU onsite course. The system maintains a course schedule and allows students to register based on certain prerequisites. Course enrollment verifies prerequisites as well as provides a waiver process to allow a student into a course.

Test Delivery - The course administrator can centrally set up the test delivery engine to the specific course needs. This includes course, lesson, and terminal learning objective level tests generated at random from a question pool. The test engine selects one question per enabling learning objective for each test. Questions are not repeated until the student has used all questions in the pool. Answers and distracters are also presented at random. The test function supports multiple choice, all that apply, sorting, matching, and fill in the blank questions. Images can also be used as questions or distracters or to enhance the test. Test item analysis is also conducted as a report feature in the system.

Course Evaluation - A survey is available during and after the course to provide feedback on the students feeling on the course and course delivery. The course evaluation is based on a survey engine that supports dimensions and categories.

Student Tracking - User progress as well as bookmarking is provided by the system. The student or instructor can see student progress and analyze course material. The grade book feature allows instructors to compile evaluation material for non-self contained courses.

Report Generation - The system has a number of pre-canned reports to support student tracking and management.

Problem Resolution - A trouble ticket system exists to support students having problems, tracking issues, and determined enhancements. Trouble tickets are routed to second tier help desk personnel. Tickets are resolved or forwarded to a party that can resolve the tickets in an expeditious manner. The tier 1 help desk is supported at The National Technical Information Service (NTIS) with tickets generated from the on-line feedback or calls made to the help desk. The National Technical Information Service is the federal government's central source for the sale of scientific, technical, engineering, and related business information produced by or for the U.S. government.

Site Collaboration - A host of collaboration tools such as forums, IRC's, news, library, tasks, and calendar, are available for asynchronous and synchronous communication. The tools can be used for homework, teams, or to present site-specific information.

DAU's Approach to Developing Courseware

The DAU web-based learning environment is designed to support both procedural training and more complex cognitive training related to decision making and problem solving. Simple HTML-based lessons are used when presenting basic procedural information. In other courses requiring students to responding to complex cognitive stimuli encountered on the job; AuthorWare lessons, video teletraining, web conferencing, or other methods are combined with the HTML environment to address these more complex learning outcomes.

Performance outcomes refer to the task and performance levels desired of students during and after completing the course. Typically, a courseware developer would ask the following questions related to performance outcomes during analysis: What are the primary tasks to be trained? What are the characteristics of the desired task performance? Is the task primarily procedural or cognitive? What are the current and desired performance levels?

Learner interactions refer to the predominant learning styles, diversity and motivation of the student population. Typically, a courseware developer would ask the following questions related to learner interactions during analysis: Do members of the target student population have strong learning style preferences? How diverse are the members of the student population? What types of collaborative learning are desired? How motivated are the students to learn the course content?

In addition, DAU recommends that courseware developers address the following five areas related to learner interactions:

Layering Information – DAU students have diverse backgrounds and prior training experiences. Therefore, it is essential to allow students' access to layered or "popup information" for additional explanations of terms and concepts. By layering information, students who know the material have the option to bypass it.

Maximizing Student Control – Students are given learner control for the majority of the pathways through the lessons. A recommended sequence is provided, but students are allowed to select their own pathways after completing the first lesson.

Managing Web Surfing – Web links within lessons need to be managed carefully, since some students who are unfamiliar with the web environment may be unable to find their way back to the lesson after following an embedded web link. Therefore, students are offered selected web links after completing the core lesson materials. This is accomplished by providing web links on a lesson exit page, so students can complete the lesson before following the recommended links.

Encouraging Collaboration – Both synchronous and asynchronous forums are offered to students. Because most students are taking courses while on the job, asynchronous communication modes are preferred.

Motivating Students – Motivation can be addressed by creating simulated characters that reappear throughout the lessons, using appropriate humor, and sending personalized email messages from an assigned faculty member when milestones are accomplished.

Testing and Evaluation

Testing and evaluation refers to the students' mastery of the course content after completing the course. Typically, a courseware developer would ask the following questions related to testing and evaluation during analysis: What types of testing will be administered? What types of test security will be required? What if students fail to demonstrate mastery of the course content? Will follow-up data be collected?

Currently, DAU suggests courseware developers consider the following three areas related to testing and evaluation:

Test Security Issues – DAU students are required to complete courses as part of job certification requirements. Therefore, testing is critical. DAU addresses test security using the following strategies:

- Random generation of test items from test item pools so that students get unique combinations of test items
- Random placement of distracters within test items
- Comparison of performance within lesson quizzes to final test performance
- Inclusion of test items that are difficult enough to be valid if the student uses references.

Testing as a Learning Activity – For most courses, DAU students are allowed three attempts to achieve 100% mastery on the lesson's learning objectives. If a student fails to demonstrate mastery, the student is told to contact his/her assigned faculty member. The faculty member also receives a notice that the student has failed to reach full mastery. The faculty member reviews the questions missed on each attempt. Based on this item analysis, the faculty member develops an individualized plan for helping the student improve his/her performance. When the faculty member is satisfied the student has mastered the test material, he/she can automatically override the student's tests results.

Student–Faculty Interactions

Student–faculty interactions are an important component in the development of courseware. Typically, a developer would ask the following questions related to student–faculty interactions during analysis: What types of interaction are required between students and faculty? What is the anticipated faculty-to-student ratio? Will students be assigned to faculty in cohorts?

DAU recommends that courseware developers address the following three areas related to student–faculty interactions:

Individual Faculty Assignments – Each DAU student is assigned to a faculty member. After registering for the course, the student receives an email message with a greeting from the assigned faculty member. Subsequent communication with faculty are based on the course being presented and the student's needs. The environment provides for: synchronous and asynchronous private conferences between faculty and students, customized and automatic email messages, an instant feedback button present on most screens to create a trouble ticket (Note: If the feedback is course related, it is usually assigned to the appropriate instructor.)

Faculty-to-Student Ratios – The first step is to identify the critical types of faculty interactions to be offered and then to determine the demands those interactions will place on the assigned faculty. DAU estimates the faculty-to-student ratio during the course design. During the operational trial of the course, the ratio may be adjusted based on the actual demands on faculty time. If an instructor needs additional support, a second instructor and section can be established. It is critical to designate backup instructors so those assigned instructors can take a day off without impeding the progress of the course.

Cohorts vs. Rolling Admissions – The DAU environment allows courseware developers to set up courses in cohorts (all students within a section start at the same time) or rolling enrollment (students are enrolled in a section at any time as long the faculty member has an opening). Cohorts are used when it is critical to keep students progressing through the lessons at the same pace. For examples, cohorts are used when web-based training is combined with video teletraining and students must be prepared for scheduled video teletraining broadcasts. Rolling admissions are used when quick access to course materials is more important that keeping students moving at an assigned pace.

Defining the Course Structure

The OSS includes a hierarchical structure to support courseware delivery through the OSS. The course hierarchy contains the framework for the courseware. Currently, DAU has defined the default courseware hierarchy to contain Course, Lesson, TLO, and ELO levels. The courseware developer has the ability to configure lesson dependencies. The OSS supports only serial dependencies. Therefore, access to Lesson 2 can be dependent upon successful completion of Lesson 1. The ELO is designated as the question level where all test questions are entered. Currently, the OSS supports the following question types: multiple choice, all that Apply, matching, sorting, fill in the blank. The OSS provides the capability to create, modify, and delete tests. Tests can be defined at the course, lesson, TLO and ELO levels. The OSS supports the following test types: Normal Test – The normal test can exist at any level in the course hierarchy. Successful completion of this test generates a pre-defined email and marks the level at which the test is taken as complete. The courseware developer can define the number of attempts allowed and the passing grade. A test may be created at the course, lesson, TLO and ELO level of the course hierarchy. Only one test may exist at a given level. When defining a test, the courseware developer must provide a unique test number along with a unique title, passing grade, the number of attempts allowed, predecessor/required node, and predecessor/required test. The courseware developer has the ability to configure test dependencies. The OSS supports only serial dependencies. Therefore, access to the Lesson 2 test can be dependent upon successful completion of the Lesson 1 test. The courseware developer is restricted from creating a circular dependency. For example, the courseware developer cannot designate Test 1 dependent upon Test 2 if Test 2 is already dependent upon Test 1. By selecting a dependent test, the courseware developer indicates that the student cannot take the defined test until the predecessor/required test has been successfully completed.

Test Questions

The OSS provides the capability to create, modify, and delete test questions. The OSS supports the following question types: multiple choice, all that apply, matching, sorting, and fill in the blank. The system supports the inclusion of images within the test question or test choices. Images are integrated into the test application by embedding the image tag within the actual question or choice.

Deciding Which OSS Tools to Integrate

In deciding which of the OSS collaboration tools to integrate into the courseware, the courseware developer should be guided by the principle that student-to-faculty and student-to student interaction of all types is desirable in order to increase the potential means for learning. Therefore, DAU courseware should be designed for interactivity, i.e. to incorporate multiple methods of interaction. The following OSS collaboration tools are available for integration into courseware: News, Library, Forum, Calendar, Task, Glossary, FAQ, Email, and Chat.

Each course can include the following set of functional modules: News, Library, Forum, Calendar, Task, Glossary, FAQ, Email, and Chat. Feedback (email to the OSS System Administrator) is available at any time from the left-hand button bar. To prevent duplication of effort, access to the OSS course functional modules is available from within the courseware. The user will populate these modules using the administrative screens as described in Populating OSS Tools below. The courseware will then include links that allow the student to access the functional

modules from within the courseware. A coding example for integrating the Glossary functional module within the courseware is as follows: <cfoutput> Glossary </cfoutput>

Populating OSS Tools

To support population of collaboration tools, bulk uploads are available at both the course and section levels. Bulk uploads are an alternative to manually populating the OSS tools using admin screens and forms. Course level uploads are used by the course administrator to provide course materials to all sections and by course instructors for their individual sections. Once course level entries are made, all sections that are created or started after the upload will inherit the information at the course level. Sections that already exist can inherit newly uploaded material by checking the inherit box. Section level loads are used by the instructor for providing information that is specific to their section. Section level uploads will be appended to the course information that was inherited by the section. Course and section uploads follow similar procedures and can be done for glossary terms, FAQ items, and library links.

There are five levels of privileges for each collaboration tool or function.

0 = No Access – No access to the associated function

1 = View Only – Access to view items within the associated function

2 = View & Edit – Access to view, create, and edit own created items within the associated function

3 = Limited Admin – Access to view, create, and edit items created by all users with View & Edit privilege, and to edit own created items within the associated function

4 = Admin Rights – Access to view, create, and edit any item within the associated function, regardless of the creator

The OSS contains multiple levels of information, including the DAU Public Website (public site), DAU Virtual Campus (private site), course level and section level. The reason for having multiple levels is to allow for information security and compartmentalization. In this way, users can only see the data to which they have been granted access. The course level is displayed when a user (other than a student) clicks on a course title link from the Home Desktop. The course level provides a course template for all sections of the course, and serves as the repository for course information. Course-related data is usually entered at the course level, in order to provide consistent information to all sections. At this level, instructors, course administrators and other authorized users can interact within the course environment. The section level is displayed when a user (other than a student) clicks on a section number link from the Home Desktop, or when a student clicks on a course title link. New sections inherit OSS data specified at the course level. Section-specific data is entered at the section level. At this level, all members of a particular course section (instructor and students) can interact within the section's virtual classroom environment.

Summary

The Defense Acquisition University virtual campus is a unique model for web based instruction because it integrates all aspects of managing a corporate university while providing myriad dynamic layers of access privileges. The OSS provides functionality in 16 main areas: DAU Public Website, Registration, Enrollment , Login , OSS User Types, OSS Collaboration Tools, Search , History, Logs, Reports, Canned Email, Feedback, Help, Courseware Interfaces, Test Application , and Database Interfaces. This paper has attempted to describe the functionality of the DAU's virtual campus. However, the virtual campus is best communicated through active demonstration and interactive dialogue.

Acknowledgements
We would like to thank Ric Cadenas and his staff at Booze Allen and Hamilton for their excellent support and service to this project. Also, certain aspects of this paper were modified and adapted from various user support manuals developed by Booze Allen and Hamilton.